

[illegible]

Bulk data is read or written by an application on a first computer system to a file on a second heterogeneous computer system. Alternatively it is read or written as bulk data directly between applications on these heterogeneous systems. Jobs or tasks are started from one system to execute on a second heterogeneous system. Results are then returned to the first system. Checkpointing and later restarting is also initiated from a first system for execution on the second heterogeneous system.